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2,742,082

HEIGHT-ADJUSTABLE STOOLS

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2 Sheets-Sheet 1

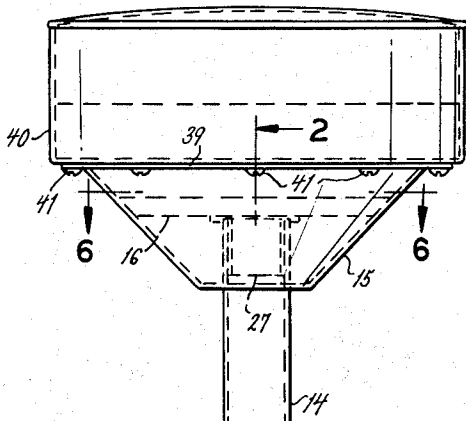


FIG. 1.

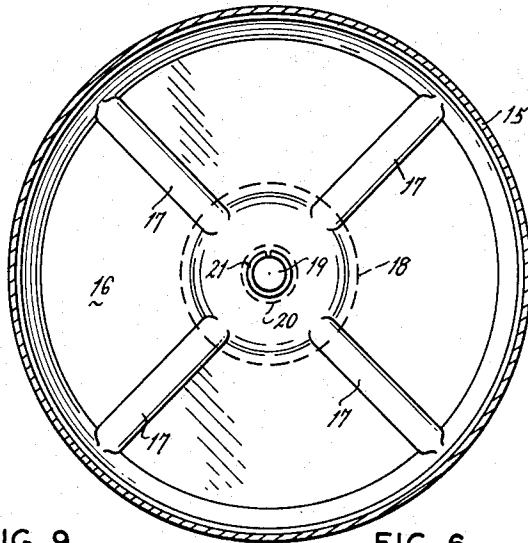


FIG. 6.

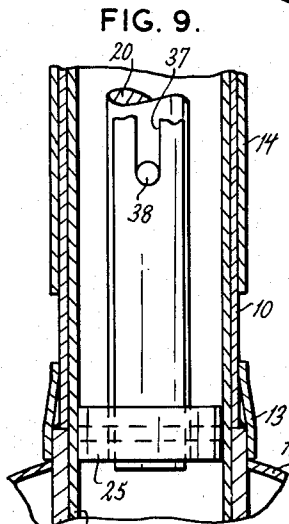


FIG. 9.

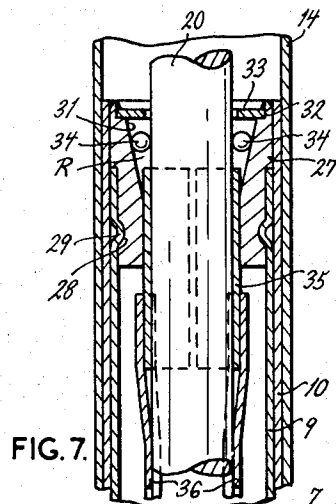


FIG. 7.

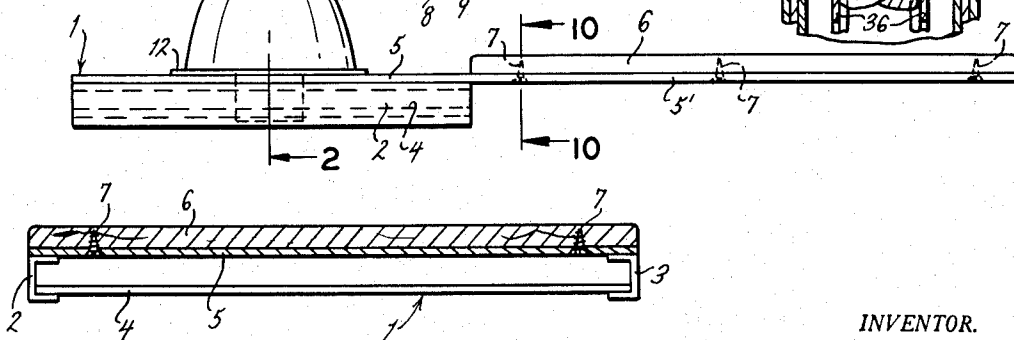


FIG. 10.

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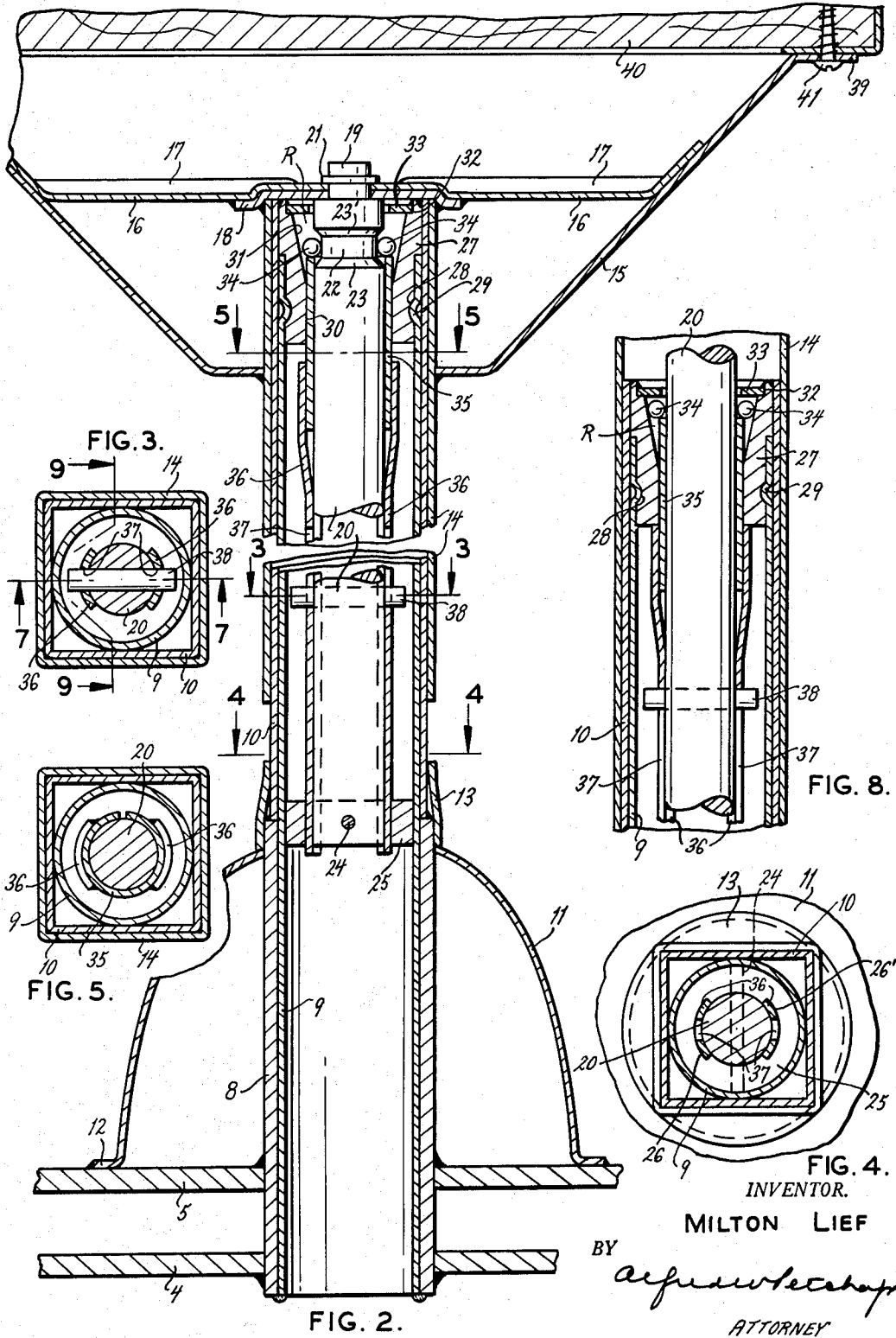
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2 Sheets-Sheet 2



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1

2,742,082

HEIGHT-ADJUSTABLE STOOLS

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5 Claims. (Cl. 155-94)

This invention relates in general to certain new and useful improvements in seating structures and, more particularly, to a height-adjustable stool.

It is the primary object of the present invention to provide a height-adjustable stool which is relatively simple in construction and is unusually rugged and long-wearing.

It is also an object of the present invention to provide a stool of the type stated which can be economically and compactly constructed from a relatively small number of component elements.

It is a further object of the present invention to provide a stool of the type stated in which the vertical height of the seating element can be adjusted to any position between selected upper and lower limits and will be firmly held at any position of adjustment without slippage or yielding even under excessive loading conditions.

It is an additional object of the present invention to provide a stool which may be adjusted to various different heights by simply lifting the stool to the selected height and bringing it to rest in the desired position.

With the above and other objects in view, my invention resides in the novel features of form, construction, arrangement, and combination of parts presently described and pointed out in the claims.

In the accompanying drawings (two sheets)—

Figure 1 is a side elevational view of a stool constructed in accordance with and embodying the present invention;

Figure 2 is a vertical sectional view taken along line 2-2 of Figure 1;

Figures 3, 4, and 5, are fragmentary horizontal sectional views taken along lines 3-3, 4-4, and 5-5, respectively, of Figure 2;

Figure 6 is a horizontal sectional view taken along line 6-6 of Figure 1;

Figure 7 is a fragmentary vertical sectional view taken along line 7-7 of Figure 3 showing the height-adjustment mechanism of the stool in locked position;

Figure 8 is a fragmentary vertical sectional view similar to Figure 7 showing the height-adjustment in unlocked position;

Figure 9 is a vertical sectional view taken along line 9-9 of Figure 3; and

Figure 10 is a transverse sectional view taken along line 10-10 of Figure 1.

Referring now in more detail and by reference characters to the drawings, which illustrate a preferred embodiment of the present invention, A designates a height-adjustable stool comprising a base 1 consisting of two spaced parallel channels 2, 3, of equal length and secured together by a substantially square bottom plate 4 welded or otherwise rigidly attached to the lower flanges thereof. Also welded to and extending horizontally between the upper flanges of the channels 2, 3, is a top plate 5 disposed in upwardly spaced parallel relation to the bottom plate 4 and projecting outwardly in front thereof by a substantial distance to provide an extension portion 5' to which a foot board 6 is secured by means of wood screws 7.

2

Mounted centrally of the base 1 and extending vertically upwardly therefrom is a standard 8 formed preferably of metallic tubing having a square cross-sectional shape and being welded at its lower end to the bottom plate 4. Tightly disposed within the standard 8 and projecting upwardly therefrom is a post member 9 also formed of metallic tubing having circular cross-sectional shape and being welded at its lower end to the standard 8. The upper end of the post 9, which projects beyond the standard 8, is, furthermore, provided with an external tubular sheath 10, which abuts against the upwardly presented horizontal margin of the standard 8 and is tack welded thereto. The upwardly projecting end of the standard 8 is decoratively enclosed within a somewhat parabolic bell 11 having an outward flange 12, which is welded to the upper face of the plate 5. At its upper end, the bell 11 abuts against the outer peripheral surface of the standard 8 and the juncture lines between the bell 11 and the standard 8, as well as between the standard 8 and the sheath 10, are concealed by a ferrule 13.

Telescopically mounted externally upon the sheath 10, for snug-fitting slidable engagement therewith, is a seat-supporting tube 14 which projects at its upper end through an inverted frusto-conical metallic stamping 15, to which it is welded. The stamping 15 is, furthermore, provided interiorly with a horizontal reinforcing plate 16 having a plurality of radial corrugations 17 for imparting strength and rigidity thereto. In its central area, the reinforcing plate 16 is dished upwardly for receiving a circular disk 18, which is welded to the under side of the reinforcing plate around its peripheral margin and is, in turn, shaped to provide a shallow socket for receiving the upper end of the seating post 14 which is, in turn, welded thereto, substantially as shown in Figure 2. The reinforcing plate 16 and disk 18 are concentrically apertured for receiving the upper diametrically reduced end 19 of a vertical grip-rod 20. The grip-rod end 19 is annularly under-cut for receiving a retaining ring 21 by which the grip-rod 20 is rigidly secured to the reinforcing plate 16 and disk 18. The grip-rod 20 extends concentrically downwardly through the seating post 9 and is of such length that, when the stool is shifted to its lowermost position with the under face of the disk 18 resting upon the upwardly presented end face of the sheath 10, as shown in Figure 2, the lower end of the grip-rod 20 will be located approximately at the upper end of the standard 8. Just below the disk 18, the grip-rod 20 is provided with an annular groove 22 having upwardly and downwardly tapered shoulders 23, 23', for purposes presently more fully appearing.

Rigidly secured to the lower end of the grip-rod 20 by means of a diametral pin 24 is an external grip-rod stabilizing collar 25, which bears slidably on its outer peripheral face against the interior surface of the seating post 9. On its interior face, the stabilizing ring is provided with two diametrically opposite quarter-circle recesses 26, 26', which are respectively located on opposite sides of the pin 24, substantially as shown in Figure 4.

Slip-fitted into the upper end of the seating post 9 is a chuck-forming sleeve 27 having an arcuate annular groove 28 into which the post 9 is rolled, as at 29, whereby the sleeve 27 is retentively secured in place. The interior of the chuck-forming sleeve 27 is provided with a cylindrical bore 30, which extends upwardly from the lower end thereof and merges into an upwardly and outwardly diverging conical chuck-face 31. At its upper end, the chuck-face 31 is counterbored to provide a shouldered recess 32 for receiving a bearing disk 33, which is internally bored for snug-fitting slidable engagement against the grip-rod 20. Located loosely within the conical recess formed between the chuck-face 31 and the outer face of the grip-rod 20 is a ring of ball-bearings 34, the diametral size of which

is slightly smaller than the width of the recess at its upper or widest end.

Slidably interposed between the bore 30 and the grip-rod 20 is a sleeve 35 formed of spring steel or other similar resilient material so as to impose an appreciable degree of friction against the bore 30. Welded or otherwise rigidly secured to the lower end of the sleeve 35 at diametrically opposite positions are two elongated lath-like operating bars 36 having a quarter-circle cross-sectional shape conforming to the curvature of the grip-rod 20 in order to lie smoothly and snugly thereagainst. The operating bars 36 are provided with elongated vertical closed-end slots 37, the upper end of which is located substantially below the points of attachment between the bars 36 and the sleeve 35. Similarly, the lower ends of the slots 37 are located substantially above the lower transverse ends of the bars 36. The slots 37, furthermore, slidably embrace the outwardly projecting ends of a diametral pin 38 rigidly fixed in the lower end of the grip-rod 20 a short distance above the stabilizing collar 25. The upper end of the sleeve 35 projects upwardly into the conical recess R to the position shown in Figure 7. In this position, the steel balls 34 are free to drop downwardly under the influence of gravity until they are tightly wedged between the chuck-face 31 and the grip-rod 20. Thus, the grip-rod 20 will be prevented from moving downwardly by the steel balls 34. However, the grip-rod 20 may be pulled upwardly, since such movement will cause the steel balls to roll upwardly and loosen their grip upon the grip-rod 20. As soon as upward movement is stopped, the balls 34 will again roll down into gripping position to hold the grip-rod in such upwardly shifted position. During vertical movement, the grip-rod 20 is stabilized at its lower end by the stabilizing collar 25 and at its upper end by the bearing disk 33.

The upper margin of the stamping 15 is provided with a horizontal flange 39 for supporting the seat element 40, which may be of any conventional type or design and is secured thereto by means of wood screws 41.

In use, the seat 40 may be pulled upwardly from its lowermost position to any desired position of vertical adjustment until the grip-rod 20 reaches the upper limit of its travel, that is to say, the position shown in Figure 8 in which the pins 38 are at the top of the slots 37 and the end faces of the bars 36 abut against the under face of the sleeve 27. In any selected position of adjustment, the entire structure will be held firmly in place by means of the steel balls 34 in the manner above described. If, however, it is desired to lower the seat 40, it is pulled upwardly until the pin 38 engages the upper end of the slots 37 in the operating bars 36. A short amount of continued upward movement will cause the operating bars to be pushed upwardly and the sleeve 35 will, in turn, be pushed upwardly into the recess R, lifting the steel balls 34 to the position shown in Figure 8. In this position, the steel balls 34 will be completely disengaged from the grip-rod 20 and the latter, together with its supported structure, may be lowered all the way down to the lowermost position. As the grip-rod 20 reaches its lowermost position, as shown in Figure 2, the pin 38 will now engage the lower ends of the slots 37 in the actuating bars 36 and a short amount of continued downward movement will shift the operating bars 36 downwardly withdrawing the sleeve 35 and causing the steel balls 34 to drop downwardly again in the recess R. At this position, however, the annular groove 22 is disposed within the recess R so that the steel balls 34 will ride loosely against the grip-rod 20, notwithstanding the downward retraction of the sleeve 35. However, as the seat 40 and its associated supporting structure, including the grip-rod 20, is elevated a short distance, the groove 22 will move upwardly out of the recess R and the steel balls 34 will re-engage the grip-rod 20 for the

purpose of holding it in any selected position of upwardly shifted or vertical adjustment.

The user, therefore, can directly adjust the seat 40 to any vertical height desired which is above a previous position by simply moving the seat upwardly to the selected position. On the other hand, if the user desires to adjust the seat downwardly to a position below a previous position, the seat 40 and its entire supporting structure, including the grip-rod 20, must be lifted to the upper limit of its travel and lowered all the way to the bottom again so that the desired vertical height may be thereafter reached by upward lifting movement of the seat 40.

It should be understood that changes and modifications in the form, construction, arrangement, and combination of the several parts of the height-adjustable stool may be made and substituted for those herein shown and described without departing from the nature and principle of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. An elevating pedestal for stools and the like comprising a base element, a vertical tube rigidly fastened at its lower end to the base and provided at its upper end with a chuck-forming sleeve having a tapered inner face which diverges upwardly, a seat supporting element telescopically mounted in the tube and disposed loosely through the chuck-forming sleeve, a plurality of balls loosely disposed between the tapered face of the chuck-forming sleeve and the seat supporting element for binding the latter against downward movement while leaving it free for upward movement, a slidable sleeve operatively mounted in the lower end of the chuck-forming sleeve and disposed loosely around the seat supporting element, said slidable sleeve being adapted upon upward shifting movement to push the balls upwardly to a position in which they will not bind the seat supporting element, said slidable sleeve being further adapted, upon downward shifting movement, to drop away from the balls, leaving them free to bind the seat supporting element and hold it in any upwardly shifted position, an actuator bar attached to and extending downwardly from said slidable sleeve between the tube and the seat supporting element, said actuating bar being provided with a closed ended vertical slot, and a pin in the lower end of the seat supporting element and engaged in said slot for shifting the slidable sleeve upwardly when the seat supporting element reaches the upper limit of its travel and shifting the slidable sleeve downwardly as the seat supporting element reaches the lower limit of its travel.

2. An elevating pedestal for stools and the like comprising a base element, a vertical tube rigidly fastened at its lower end to the base and provided at its upper end with a chuck-forming sleeve having a tapered inner face which diverges upwardly, a seat supporting element telescopically mounted in the tube and disposed loosely through the chuck-forming sleeve, a plurality of balls loosely disposed between the tapered face of the chuck-forming sleeve and the seat supporting element for binding the latter against downward movement while leaving it free for upward movement, a slidable sleeve operatively mounted in the lower end of the chuck-forming sleeve and disposed loosely around the seat supporting element, said slidable sleeve being adapted upon upward shifting movement to push the balls upwardly to a position in which they will not bind the seat supporting element, said slidable sleeve being further adapted, upon downward shifting movement, to drop away from the balls, leaving them free to bind the seat supporting element and hold it in any upwardly shifted position, an actuator bar attached to and extending downwardly from said slidable sleeve between the tube and the seat supporting element, said actuating bar being provided with a closed ended vertical slot, a pin in the lower end of the seat supporting element and engaged in said slot for shifting the slidable

5

sleeve upwardly when the seat supporting element reaches the upper limit of its travel and shifting the slidable sleeve downwardly as the seat supporting element reaches the lower limit of its travel, and a stabilizing member mounted on the lower end of the seat supporting element for sliding engagement with the interior of the tube.

3. An elevating pedestal for stools and the like comprising a base element, a vertical tube rigidly fastened at its lower end to the base and provided at its upper end with a chuck-forming sleeve having a tapered inner face which diverges upwardly, a seat supporting element telescopically mounted in the tube and disposed loosely through the chuck-forming sleeve, a plurality of balls loosely disposed between the tapered face of the chuck-forming sleeve and the seat supporting element for binding the latter against downward movement while leaving it free for upward movement, a slidable sleeve operatively mounted in the lower end of the chuck-forming sleeve and disposed loosely around the seat supporting element, said slidable sleeve being adapted upon upward shifting movement to push the balls upwardly to a position in which they will not bind the seat supporting element, said slidable sleeve being further adapted, upon downward shifting movement, to drop away from the balls, leaving them free to bind the seat supporting element and hold it in any upwardly shifted position, an actuator bar attached to and extending downwardly from said slidable sleeve between the tube and the seat supporting element, said actuating bar being provided with a closed ended vertical slot, a pin in the lower end of the seat supporting element and engaged in said slot for shifting the slidable sleeve upwardly when the seat supporting element reaches the upper limit of its travel and shifting the slidable sleeve downwardly as the seat supporting element reaches the lower limit of its travel, and a stabilizing member mounted on the lower end of the seat supporting element for sliding engagement with the interior of the tube, said stabilizing member being slotted for clearing the actuator bar.

4. An elevating pedestal for stools and the like comprising a base element, a vertical tube rigidly fastened at its lower end to the base and provided at its upper end with a chuck-forming sleeve having a tapered inner face which diverges upwardly, a seat supporting element telescopically mounted in the tube and disposed loosely through the chuck-forming sleeve, a plurality of balls loosely disposed between the tapered face of the chuck-forming sleeve and the seat supporting element for binding the latter against downward movement while leaving it free for upward movement, a slidable sleeve operatively mounted in the lower end of the chuck-forming sleeve and disposed loosely around the seat supporting element, said slidable sleeve being adapted upon upward shifting movement to push the balls upwardly to a position in which they will not bind the seat supporting element, said slidable sleeve being further adapted, upon downward

6

shifting movement, to drop away from the balls, leaving them free to bind the seat supporting element and hold it in any upwardly shifted position, an actuator bar attached to and extending downwardly from said slidable sleeve between the tube and the seat supporting element, said actuating bar being provided with a closed ended vertical slot, a pin in the lower end of the seat supporting element and engaged in said slot for shifting the slidable sleeve upwardly when the seat supporting element reaches the upper limit of its travel and shifting the slidable sleeve downwardly as the seat supporting element reaches the lower limit of its travel, a stabilizing member mounted on the lower end of the seat supporting element for sliding engagement with the interior of the tube, and a stabilizing bearing disk rigidly mounted in the upper end of the tube and being slidably engaged with the seat supporting member.

5. An elevating pedestal for stools and the like comprising a base element, a vertical tube rigidly fastened at its lower end to the base and provided at its upper end with a chuck-forming sleeve having a tapered inner face which diverges upwardly, a seat supporting element telescopically mounted in the tube and disposed loosely through the chuck-forming sleeve, a plurality of balls loosely disposed between the tapered face of the chuck-forming sleeve and the seat supporting element for binding the latter against downward movement while leaving it free for upward movement, a slidable sleeve operatively mounted in the lower end of the chuck-forming sleeve and disposed loosely around the seat supporting element, said slidable sleeve being adapted upon upward shifting movement to push the balls upwardly to a position in which they will not bind the seat supporting element, said slidable sleeve being further adapted, upon downward shifting movement, to drop away from the balls, leaving them free to bind the seat supporting element and hold it in any upwardly shifted position, a pair of diametrically opposite actuator bars attached to and extending downwardly from said slidable sleeve between the tube and the seat supporting element, said actuating bars each being provided with a closed ended vertical slot, and a pin in the lower end of the seat supporting element and engaged in said slots for shifting the slidable sleeve upwardly when the seat supporting element reaches the upper limit of its travel and shifting the slidable sleeve downwardly as the seat supporting element reaches the lower limit of its travel.

References Cited in the file of this patent

UNITED STATES PATENTS

720,549	Adler	Feb. 17, 1903
2,010,290	Campbell	Aug. 6, 1935
2,364,191	Campbell	Dec. 5, 1944